General

Guideline Title

Guidelines for the public health management of typhoid and paratyphoid in England. Practice guidelines from the National Typhoid and Paratyphoid Reference Group.

Bibliographic Source(s)

Balasegaram S, Potter AL, Grynszpan D, Barlow S, Behrens RH, Lighton L, Booth L, Inamdar L, Neal K, Nye K, Lawrence J, Jones J, Gray I, Tolley D, Lane C, Adak B, Cummins A, Addiman S, Typhoid and Paratyphoid Reference Group, Health Protection Agency. Guidelines for the public health management of typhoid and paratyphoid in England: practice guidelines from the National Typhoid and Paratyphoid Reference Group. J Infect. 2012 Sep;65(3):197-213. [59 references] PubMed

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

Table 1. Summary of New Guidelines and Rationale for Recommendations

Area of Guidance	Detail of Guidance	Rationale
A. Public Health Case Definitions		
Possible case	• A person with a clinical history compatible with enteric fever and where the clinician suspects typhoid or paratyphoid as the most likely diagnosis. • A person with clinical history of fever and malaise and/or gastrointestinal symptoms with an epidemiological link to a source of enteric fever (e.g., from "warn and inform" information). • A returning traveller reporting diagnosis abroad with NO documented evidence of blood/faecal culture, or with serological confirmation alone.	• Clearly define into possible, probable, or confirmed cases as this influences public health action. • Clinical symptoms in a returning traveller can initially resemble a number of other tropical diseases, e.g., malaria, therefore defined as 'possible' and no public health action until blood culture or faecal sample positive for *S. typhi* or *S. paratyphi*. • Systematic plan for public health management of recovered (asymptomatic) returning travellers.
Probable case	• Local laboratory presumptive identification of *Salmonella typhi* or *paratyphi* on faecal	

Area of Guidance	Detail of Guidance	Rationale
	or blood culture, with or without a clinically compatible history. • A returning traveller giving a clinical history compatible with enteric fever and with documentation of a positive blood/faecal culture and/or treatment for enteric fever overseas.	
Confirmed case	• A person with *S. typhi* or *S. paratyphi* infection determined by a salmonella reference laboratory (including documented evidence from a recognised overseas reference laboratory).	
Travel-related case	• A case who develops symptoms of enteric fever within 28 days of travel to an endemic region of the world, as defined by the National Travel Health Network and Centre.	• Enhanced surveillance data (see Figure 2 in the original guideline document) shows 96% of cases with a travel history have onset within 28 days of return from travel, and that there is no observable difference between typhoid and paratyphoid.
Contact	Definitions for contacts expanded to include: • Co-traveller: someone who travelled with the case and who is likely to have been exposed to the same source of infection as the case. • Household: someone who lives in the same household as the case and/or has shared a bathroom and/or food prepared by the case whilst the case was symptomatic and up to 48 hours after commencement of antibiotics. • Other contacts: not restricted to but may include close/sexual contacts or close friends/family who have eaten food prepared by the case whilst they were symptomatic. • Wider contacts, e.g., colleagues who prepare and eat food with the case at a catering establishment or customers of a food business, if case was there whilst symptomatic or is a non-travel-related case.	Action taken for contacts should depend on: • Their risk of having acquired infection from a similar exposure to the case (e.g., co-travellers), or from the case themselves (household or other contacts), or from a food source. • Whether they may be the source of the case's infection (wider contacts who may require screening).
Carriers	• Convalescent carrier: A person who is still excreting *S. typhi* or *S. paratyphi* after two courses of appropriate antibiotic therapy, but has been excreting for less than 12 months. • Chronic carrier: A person who continues to excrete *S. typhi* or *S. paratyphi* for 12 months or more.	• No scientific evidence stating number of samples or length of time required before classifying a case as a carrier. • Pragmatic definitions enable effective public health management and discharge of carriers from follow up where appropriate, based on individual risk assessment.
Risk groups	• Risk assessment to include both risk groups and risk activities (those of doubtful personal hygiene, children aged five years old or under who attend school or pre-school groups, health care workers, those whose work involves preparing or handling unwrapped food, and clinical, social care, or others working with vulnerable groups).	• Allows cases to be excluded from risk activities rather than excluded from their workplace, based on evidence of economic burden on the individual case and family and compliance with clearance schedules and exclusion.
Area of Guidance	**Detail of Guidance**	**Rationale and Discussion**

B. Recommendations

Area of Guidance	Detail of Guidance		Rationale
1. CONFIRMATION OF DIAGNOSIS prior to public health management	Use Algorithm 1: Question 1 in the original guideline document to determine whether the case is POSSIBLE, PROBABLE, or CONFIRMED		
	• Diagnosis for public health purposes should be through culture of organism from blood or faeces.	• All positive samples to be sent to a reference laboratory for confirmation and typing. • Diagnosis using serology is not recommended for public health management. • Full public health action should only be undertaken for probable or confirmed cases (see Algorithm 1, Question 1 in the original guideline document).	• Typhoid and Paratyphoid Reference Group (TPRG) consensus on the need for further investigations into possible cases prior to public health action, and the role of reference laboratories in confirming cases. • Expert opinion and TPRG consensus supports the poor efficacy of serology for diagnosis for public health purposes.
2. GENERAL PRINCIPLES to reduce risk of transmission	• General advice about hygiene. • A "warn and inform" approach.	• All cases and contacts should be advised on steps to reduce risk of infection, and given standardised information emphasising the need for clinical assessment and exclusion from risk activities if symptoms develop.	• Good hygiene is effective in reducing transmission. In addition, most infected individuals will be symptomatic; transmission from asymptomatic individuals is rarely observed. Giving comprehensive hygiene advice should be best practice, and is detailed in the most comprehensive guidelines from non-endemic areas.
3. PUBLIC HEALTH MANAGEMENT OF PROBABLE and CONFIRMED cases	• Use Algorithm 1: Question 2 in the original guideline document to determine whether the case is in a risk group or undertakes risk activities.		
	• Clearance: recommended for those in risk groups, with 3 samples, 48 hours apart, commencing 1 week after antibiotics.	• 3 samples if in any risk group or undertaking any risk activity. • No clearance necessary for cases not in risk group.	• Number of samples is based on a) comparison of other schedules in non-endemic countries which demonstrate a lack of consistency and scarce evidence base for international guidelines, and b) evidence from international literature review and local audits which demonstrate a low rate of positives; a majority of cases are positive on the first sample; lack of secondary transmission (even with reduced clearance schedules) and little evidence on widespread outbreaks from non-food handlers; limited evidence for extended follow up; issues with compliance where schedules are extensive. • For cases not in a risk group, no sampling necessary, given that result would not affect public health action: microbiological clearance and screening should only be instigated where there is clear public health benefit.
		• Clearance starts at least 1 week after completion of treatment.	• Inconsistency of international schedules (as above). No evidence found to support waiting for a specified time from onset of symptoms to begin sample collection.

Area of Guidance	Detail of Guidance		Rationale
			• Previous 2004 guidelines recommend 3 weeks after treatment completion, with the rational that "therapy may suppress levels below detection levels for several weeks after completion of a course of antibiotics". However, TPRG consensus is that antibiotics would have cleared in the majority of patients by 1 week, taking into account the potential for patients to suffer relapse after treatment.
		• 48 hour interval between each clearance sample.	• Expert consensus that typhoid and paratyphoid are intermittently excreted and so shorter sampling interval will not affect detection of organism but is likely to improve compliance with clearance and reduce burden on cases and professionals.
	• Exclusion: for those in risk groups. Otherwise exclude only until 48 hours after last symptoms.	• Exclusion for those in a risk group (see Table 2 in the original guideline document) until clearance. Redeployment should be considered as an option instead of full exclusion. • If not in a risk group, exclude for standard 48 hours after last symptom, as for gastrointestinal illness.	• Consensus that use of redeployment is pragmatic and is likely to increase compliance, especially considering reduced loss of income to cases. • No exclusion necessary for public health purposes for those not in risk groups (unless symptomatic) as there is evidence that the risk of widespread onward transmission is low, especially if effective hygiene advice is given.
4. Investigation of SOURCE	• Use Algorithm 1: Question 3 and Question 4 in the original guideline document to investigate likely source of infection		
	• Determine whether infection is likely to be travel-related or United Kingdom (UK)-acquired (see Algorithm 1: Question 3 in the original guideline document). • Investigate source for UK-acquired infections (see Algorithm 1: Question 4 in the original guideline document).	If infection is *likely* to be travel-related: • No need to further investigate source unless there is a wider travel group such as a cruise ship, package holiday.	• Literature review highlighted the need to deal differently with travel-related and locally-acquired infections in non-endemic countries, and for more thorough investigation only of the latter in order to identify source.
		If infection is *unlikely* to be travel-related: • Undertake detailed investigation of source (see box 1 and Algorithm 1: Question 4 in the original guideline document). • If no source is identified through initial risk assessment, utilise a	• Review of the international literature retrieved a number of articles presenting outbreaks of indigenously-acquired infections in non-endemic countries. These were linked to a variety of sources, including: previous history of enteric fever; direct/indirect associations with travellers visiting friends and relatives in endemic areas; individual food stuffs; contamination of food by symptomatic or asymptomatic carriers working in catering establishments or preparing common meals at gatherings. • As a result of this wide variety of sources, where source of infection unknown, a "stone in pond" approach best utilises investigative resources.

Area of Guidance	Detail of Guidance		Rationale
		widening "stone in pond" approach, as defined in the section on "principles" in the original guideline document, with contact screening and/or environmental screening.	
5. Management of CONTACTS	• Use outcomes of decisions made using Algorithm 1: Question 2, Question 3 and Question 4 in the original guideline document for the initial case to determine actions for their contacts		
	• Screening: Use Algorithm 1: Question 3 in the original guideline document to determine whether to screen contacts, depending on if infection is travel-related. • Warn and inform all contacts identified by risk assessment.	If case's infection is *likely* to be travel-related: • Screen co-travellers with one sample as soon as possible. • Warn and inform other contacts who did not travel. • No further public health action.	• There is evidence that the risk of infection is greater for co-travellers exposed to same source. Non-travelling contacts and contacts of non-travel-related cases are at lower risk of acquiring infection. Infectivity of acute cases is relatively low: the number of indigenously acquired infections traced to acutely infected persons is few and the positive sample yield from non-travelling contacts has been demonstrated to be low. Any infection should be picked up through recognition of signs and symptoms ("warn and inform" approach).
		If case's infection is *unlikely* to be travel-related: • Screen identified contacts with one faecal sample and question travel/medical history and current symptoms to investigate source of infection.	
		• If no source identified by initial risk assessment, widen contact screening ("stone in pond" approach).	• Microbiological clearance and screening should only be instigated where there is clear public health benefit. The "stone in pond" approach starts with the most likely sources of infection and only widens screening where no source is found.
	• Exclusion: only of symptomatic contacts.	• Asymptomatic contacts do not require exclusion, irrespective of whether in a risk group. • If contact is symptomatic, treat as a possible case and exclude until 48 hours after last symptoms.	• Asymptomatic contacts appear to have a low risk of infection and a low risk of transmission. There is questionable benefit of following up cases or contacts not in risk groups: better to target action on advising those exposed about good hygiene, and sample/exclude only if symptomatic.
	• If symptomatic	• Manage as case (start from	• *Symptomatic* contacts of confirmed cases are more likely to have enteric fever. If the contact fits

Area of Guidance	Detail of Guidance		Rationale
	or positive sample, manage as a case.	beginning of Algorithm 1 in the original guideline document), with appropriate clearance/exclusions depending on risk group/activities.	the case definition for probable or confirmed infection, they should be re-designated as a case.
6. Management of CARRIERS	• *Use Algorithm 2 in the original guideline document to manage cases who continue to excrete organisms and any asymptomatic contacts who are positive*		
	• Manage carriers through individual risk assessment. • Warn and inform contacts.	• Consider treatment/re-treatment only if there is ongoing public health risk. • Emphasis on redeployment as well as exclusion. • Warn and inform contacts if not done previously (e.g., of an asymptomatic contact identified on screening).	• Any public health actions should be based on systematic risk assessment. Only cases in high risk groups should be followed-up, since the literature shows that the cure rate from appropriate antibiotic treatment is high and the risk of becoming a chronic carrier is low, and that a relatively low proportion of domestically-acquired infections are linked to a carrier.

Clinical Algorithm(s)

The original guideline includes the following clinical algorithms:

- Public health management of cases and contacts
- Public health management of those who continue to excrete S. typhi or paratyphi

Scope

Disease/Condition(s)

Typhoid and paratyphoid (enteric fever)

Note: Advice on clinical management and treatment is outside the scope of this guidance.

Guideline Category

Diagnosis

Risk Assessment

Screening

Clinical Specialty

Emergency Medicine

Family Practice

Gastroenterology

Infectious Diseases

Internal Medicine

Pediatrics

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Health Care Providers

Nurses

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

To present the new guidelines for the public health management of enteric fever in England and the rationale for the recommendations

Target Population

Patients with possible, probable, confirmed or travel-related cases of enteric fever

Interventions and Practices Considered

1. Confirmation of diagnosis: culture of organism from blood or faeces
2. General principles to reduce risk of transmission
    - Warn and inform approach
    - Advice about hygiene
3. Public health management of probable and confirmed cases: determining if case is in a risk group or undertakes risk activities
4. Investigation of source of infection: determining if infection is travel-related or United Kingdom (UK)-acquired
5. Management of contacts
    - Screening contacts
    - Warning and informing all contacts identified
6. Management of carriers
    - Individual risk assessment
    - Warning and informing contacts
    - Consideration of treatment/re-treatment if public health risk

Major Outcomes Considered

- Outbreak of typhoid or paratyphoid
- Risk for transmission of typhoid or paratyphoid
- Timing of development of symptoms

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Searches of Unpublished Data

Description of Methods Used to Collect/Select the Evidence

A literature review was undertaken in 2007/2008 around the public health management of enteric fever and was comprehensively updated in July 2011. The combined literature searches incorporated the following search terms: "typhoid" OR "paratyphoid" OR "enteric fever" OR "typhi" or "paratyphi". The first literature review searched PubMed for relevant English language articles from January 1980 onwards; the updated review was restricted to articles since 01 January 2008 to the date of the search on 27 July 2011 but did not use any language restrictions.

In addition to articles discussing public health management of enteric fever, the first literature review included narrative reviews of the global epidemiology of enteric fever, as well as papers covering aspects such as laboratory diagnostic methods and antibiotic resistance. Review of articles focused specifically on the public health management of enteric fever cases and contacts. For instance outbreak reports were considered for inclusion if relevant to public health management in non-endemic countries, but articles relating to laboratory diagnosis or clinical management were excluded. Reasons for exclusion were: not relevant to public health management. Many articles discussed epidemiology of typhoid fever globally or in endemic countries, or clinical management of cases only with no mention of public health actions. Papers reporting outbreaks from endemic countries were also excluded.

Additional papers, including grey literature, were identified through reference lists and discussion with members of the Typhoid and Paratyphoid Reference Group (TPRG). In addition, health protection and environmental health practitioners were asked to send publications, local audits, guidance, and case studies.

Number of Source Documents

20 articles (case series, case reports, expert opinion papers) plus 17 outbreaks from non-endemic countries summarised in the text.

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Rating Scheme for the Strength of the Evidence

Not applicable

Methods Used to Analyze the Evidence

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

A Typhoid and Paratyphoid Reference Group was convened by the Health Protection Agency and the Chartered Institute of Environmental Health to revise guidelines for public health management of enteric fever.

The working group made recommendations on the basis of this evidence, together with analysis of enhanced surveillance data, a review of clearance and screening schedules in use in other non-endemic areas, and expert consensus.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

These guidelines were circulated for consultation in December 2011 across the Health Protection Agency (HPA)'s Health Protection Services, HPA Gastrointestinal Leads, and members of the Chartered Institute of Environmental Health (CIEH). All comments received were shared with Typhoid and Paratyphoid Reference Group (TPRG) members. The guidelines were approved by the HPA Gastrointestinal Programme Board and the CIEH Policy Development Board in January 2012.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The working group made recommendations on the basis of the evidence obtained from the literature reviews, together with analysis of enhanced surveillance data, a review of clearance and screening schedules in use in other non-endemic areas, and expert consensus.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate public health management of typhoid and paratyphoid

Potential Harms

Not stated

Implementation of the Guideline

Description of Implementation Strategy

Teaching Case Studies and Launch of the Guidelines

A collection of simulated case studies based on some common scenarios have been developed to support implementation of the new guidelines. These case studies were used in a launch event to familiarise practitioners with the guidelines. These case studies are available from the Health Protection Agency (HPA) Web site (see the "Availability of Companion Documents" field).

Implementation Tools

Chart Documentation/Checklists/Forms

Clinical Algorithm

Foreign Language Translations

Patient Resources

Resources

Slide Presentation

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Balasegaram S, Potter AL, Grynszpan D, Barlow S, Behrens RH, Lighton L, Booth L, Inamdar L, Neal K, Nye K, Lawrence J, Jones J,

Gray I, Tolley D, Lane C, Adak B, Cummins A, Addiman S, Typhoid and Paratyphoid Reference Group, Health Protection Agency. Guidelines for the public health management of typhoid and paratyphoid in England: practice guidelines from the National Typhoid and Paratyphoid Reference Group. J Infect. 2012 Sep;65(3):197-213. [59 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2012 Sep

Guideline Developer(s)

Chartered Institute of Environmental Health - Professional Association

Public Health England - Professional Association

Source(s) of Funding

Health Protection Agency/Chartered Institute of Environmental Health

Guideline Committee

National Typhoid and Paratyphoid Reference Group

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Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available from the Journal of Infection Web site .

Availability of Companion Documents

The following are available:

- Public health operational guidelines for typhoid and paratyphoid (enteric fever). A joint policy from the Health Protection Agency and the Chartered Institute of Environmental Health. Full guidance document. 2012 Jan 1. 30 p. Electronic copies: Available in Portable Document Format (PDF) from the Health Protection Agency (HPA) Web site .
- Public health operational guidelines for typhoid and paratyphoid (enteric fever). Case studies with worked examples. PowerPoint presentation. 2012 Feb. 40 p. Electronic copies: Available from the HPA Web site .
- Public health operational guidelines for typhoid and paratyphoid (enteric fever). Case studies. PowerPoint presentation. 2012 Feb 10. 32 p. Electronic copies: Available from the HPA Web site .
- Enhanced surveillance of enteric fever. Electronic copies: Available from the HPA Web site .
- Enhanced surveillance of enteric fever questionnaire (ESQ). 2012 Sept 9. 8 p. Electronic copies: Available from the HPA Web site .
- Template letter and factsheet for contacts of a case of enteric fever. Electronic copies: Available from the HPA Web site .

Patient Resources

The following available:

- Typhoid. Health advice for travellers. Factsheet. Electronic copies: Available in Portable Document Format (PDF) from the Health Protection Agency (HPA) Web site . Also available in Bengali, Gujarati, Punjabi, and Urdu languages from the HPA Web site .

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NGC Status

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